

CSC2-140 Foundations of Computer Science
Programming Assignment 1 September 26, 2019

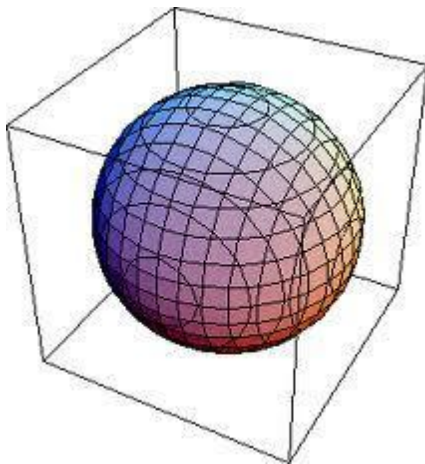
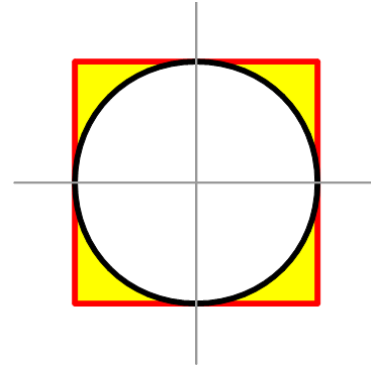
Your first programming assignment will be to use Monte Carlo methods to estimate the area inside the unit circle, the volume inside the unit sphere, and hyper-volume inside hyper-sphere.

We call the unit circle in the plane S^1 in \mathbb{R}^2 .

We call the unit sphere in 3 dimensions S^2 in \mathbb{R}^3 .

We call the unit hyper-sphere in 4 dimensions S^3 in \mathbb{R}^4 .

The equation for the (x,y) points inside the unit circle is $x^2 + y^2 < 1$. The pattern is the same in higher dimensions.



In a comment block at the top of your program after the usual name, course and date info, discuss the values you have obtained and compare them with the known exact values of these “volumes”. (You may need to use the Interwebs to find one or more of these values.) Also make some general comments about the effect of increasing N , the number of random points generated on the accuracy of your estimate.

Submit your .py file in the Moodle dropbox set up for the course. The project is due Tuesday, October 10 by 5 p.m.

As your programs become longer, you might want to review the Python style guidelines available at (surprise) <https://www.python.org/dev/peps/pep-0008/>